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Taxonomic studies in Vernonia and related genera

Henry Allan Gleason

In preparing the manuscript for the tribe Vernonieae, to be published in the North American Flora, several new species and varieties were recognized and a few nomenclatorial changes became necessary. One of the latter involves the erection of a new genus. Since the form of the North American Flora demands relatively concise descriptions and permits no critical discussion, the present paper is issued in advance.

A variety, in the opinion of the writer, represents a group which is not worthy of specific rank, yet demands recognition in the intensive study of a species. In general, varieties are not admitted into the North American Flora. Specific descriptions are drawn broadly enough to include all the varieties, while the varietal names are cited among the synonyms. The same treatment will be used for the varieties published here.

Although this paper and the manuscript for the North American Flora have been prepared at the New York Botanical Garden and are based primarily on the collections there, the writer has been greatly assisted by material from many American herbaria and takes this opportunity of expressing his thanks: to Mr. C. C. Deam and Mr. J. Lunell for material from their private herbaria; to those in authority at the University of California, the Field Columbian Museum, the University of Illinois, the Iowa Agricultural College, the University of Kentucky, the University of

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Minnesota, the Ohio State University, and the University of Wisconsin for the loan of material; to the directors or curators of the Brooklyn Botanic Garden, the Gray Herbarium, the National Herbarium, the New England Botanical Club, and the Philadelphia Academy of Sciences for the facilities of their herbaria and libraries; to Dr. B. L. Robinson, Dr. J. M. Greenman, Mr. W. R. Maxon, and Mr. E. E. Watson for information, assistance, and criticism; and especially to the University of Michigan, where part of the work was done.

VERNONIA BORINQUENSIS Urban

In describing the species, Urban took as the type a form with hirsute achenes, resinous-dotted leaves, and short straight appressed hairs on the lower leaf surface. This is the commonest form in American herbaria. Urban's variety *Stahlii* covers a much rarer form with glabrous achenes and without resinous dots on the leaves. Two other forms also occur, which are deserving of varietal names.

Vernonia borinquensis resinosa var. nov.

Achenes glabrous; leaves conspicuously dotted with glands and resin on the lower surface: otherwise like the typical form of the species.

TYPE: *ex herb. E. W. D. Holway*, collected at Cayey, Porto Rico, January, 1911, and deposited in the herbarium of the New York Botanical Garden.

Vernonia borinquensis hirsuta var. nov.

Achenes hirsute; leaves densely sericeous-hirsute beneath with bent or curved hairs 2–4 mm. long, nearly or completely concealing the resinous dots; otherwise like the typical form of the species.

TYPE: *Britton, Stevens, & Hess 2471*, collected in a wooded valley, Rio de Maricao, Porto Rico, at an altitude of 500–600 meters, April 2, 1913, and deposited in the herbarium of the New York Botanical Garden. Field notes indicate that it is a vine, two meters long.

The species and its three varieties may be distinguished as follows:

Achenes hirsute; leaves with resinous dots or glandular pits on the lower surface.	
Pubescence of short, straight, appressed hairs seldom exceeding 0.5 mm. in length.	*V. borinquensis.*
Pubescence on the lower leaf-surface of bent or curved hairs 2–4 mm. long.	*V. borinquensis hirsuta.*
Achenes glabrous.	
Glands on the lower leaf-surface present.	*V. borinquensis resinosa.*
Glands on the lower leaf-surface none.	*V. borinquensis Stahlii*

VERNONIA SERICEA L. C. Rich.

Vernonia phyllostachya (Cass.) Gleason.

We are indebted to Ekman for the application of the correct name to this well-known species. Specimens in American herbaria show a great variation in the size, proportion, and density of pubescence of the leaves, without offering legitimate opportunity for the separation of varieties.

VERNONIA GNAPHALIIFOLIA Rich.

Until the last decade this species was poorly represented in American herbaria. The collections of the New York Botanical Garden now include an ample series of specimens, sufficient to give some idea of the range of variation within the species. On casual inspection, the specimens fall into two groups, characterized by wide and narrow leaves. The latter come from the provinces of Santa Clara, Camaguey, and Oriente, that is, from eastern Cuba; while the former are from Santa Clara, Havana, and Matanzas. The wide-leaved forms have leaves from 9 × 19 mm. to 21 × 51 mm., and the ratio of length to width varies from 2.1 to 3.4. The leaves of the narrow-leaved specimens range in size from 4 × 23 mm. to 14 × 61 mm., and their ratio from 3.2 to 5.7. They make accordingly a continuous series. In all cases the leaves are somewhat revolute and densely sericeous beneath. All specimens agree in the characters of inflorescence and flower-structure except one, *Shafer 2958*, from Holguin, Oriente, which lacks the resinous dots on the principal involucral scales.

Another specimen differs so much from the specific type that it may be described as a new variety.

Vernonia gnaphaliifolia platyphylla var. nov.

Leaf-blades broadly elliptic-ovate, less than twice as long as wide, flat, not revolute at the margin, closely and finely gray-tomentose beneath; otherwise resembling the typical form of the species.

TYPE: *Britton, Cowell, and Shafer 12,933*, collected at Ensenada de Mora, Oriente, March 26–29, 1912, and deposited in the herbarium of the New York Botanical Garden. It is described as a shrub, one meter high, and is the only broad-leaved representative of the species so far known from eastern Cuba. It is also the only specimen examined within the species without the revolute leaf-margin and with distinctly tomentose pubescence.

VERNONIA ICOSANTHA DC.

Ekman has pointed out the peculiar nomenclatorial confusion attached to this well-known species of the Lesser Antilles, and has chosen to apply to it the name *Vernonia arborescens* (L.) Sw. In describing *Conyza arborescens*, Linnaeus had before him not only the plate of Plumier, portraying the *Vernonia* of the Lesser Antilles, but also an actual specimen of a different species from Jamaica. A comparison of his text with the plate shows that the description could not have been taken from the plate alone, but was based primarily on the specimen. The latter accordingly becomes the type of the species and retains the specific name *arborescens*, and *V. icosantha* remains the first valid name for the species of Martinique and Guadeloupe.

Vernonia Shaferi sp. nov.

Stem shrubby, 1–2 m. high, the young branches closely cinereous-pubescent, becoming glabrate the second year; leaf-blades ovate-lanceolate or elliptic, the largest 4 × 12 cm., the upper much smaller, all acuminate, entire, acute at the base, dark green, minutely papillose-pubescent, and very sparsely resinous-dotted above, paler green but otherwise the same below; heads about eighteen-flowered, crowded in leafy secund cymes at the ends of the branches of the season; bracteal leaves oblong or oblong-ovate, acute, 5–10 mm. long; involucres broadly turbinate to campanulate, 6 mm. high, the scales rather closely imbricate, erect or appressed, narrowly oblong-lanceolate, acuminate, irregularly pubescent and ciliate, and usually resinous toward the tip; achenes hirsute; pappus white, its bristles 6.5–7 mm. long, the paleae very irregular in length, as much as 1.5–2 mm. long, minutely erect-ciliate; flowers white or pink.

TYPE: *Shafer 172*, collected in Montserrat, January 23, 1907, and deposited in the herbarium of the New York Botanical Garden. The same herbarium also contains sheets of three other collections made on the same expedition, *Shafer 589*, *659*, and *661*.

This handsome species is obviously closely related to *V. longifolia* Pers., as shown by the shape and pubescence of the leaves, the inflorescence, and the character of the involucral scales. It is distinguished from that species at sight by the white pappus, as well as by the slightly larger heads, the much larger pappus-bristles, which are only 4–5 mm. long in *V. longifolia*, and the unusually long, barely ciliate paleae. It is a pleasure to name the species in honor of its first collector, the late John A. Shafer, who discovered several other interesting *Vernoniae* in the West Indies.

VERNONIA RACEMOSA Delp.

Vernonia racemosa Delp. Mem. Accad. Torino II. **14**: 396. 1854.

Vernonia araripensis Gleason (in part), Bull. N. Y. Bot. Gard. **4**: 181. 1906, not Gardn.

Vernonia sericea L. C. Rich. subsp. *racemosa* Ekman, Ark. Bot. 13^{15}: 85. 1914.

The two sheets in the herbarium of the New York Botanical Garden, which were referred by Ekman to *V. racemosa* as a subspecies of *V. sericea*, differ in certain features from *V. sericea*, with which they are not associated geographically, and agree better in general character with the linear-leaved species of Hispaniola and adjacent Cuba. The species-group *Arborescentes*, which includes *V. sericea*, has leaves of a broad type, not revolute, and comparatively few spreading cymes near the ends of the branches, producing a rather short and broad inflorescence. *V. racemosa* and its allied species have revolute, linear leaves and narrow, elongate inflorescences, composed of relatively short and few-headed cymes distributed over a considerable length of the axis. While this latter character is largely one of habit, the narrow revolute leaves afford a ready and accurate means of distinguishing it and its allies from the *Arborescentes*.

Vernonia rigida Sw.

Collected originally by Swartz in Jamaica in the middle of the eighteenth century, this excellent species has since been practically lost. Few botanists have examined Swartz's originals and as a result the name *V. rigida* has been applied by various collectors and students to several entirely different species. The genuine *V. rigida* was finally rediscovered by Wm. Harris at Upper Clarendon, Jamaica, December 27, 1917, and good specimens are now deposited in the herbaria of the Field Columbian Museum and the New York Botanical Garden. The species is obviously allied with the well-known Jamaican *V. acuminata* Less.

Vernonia Sagraeana angusticeps (Ekman) var. nov.

Vernonia angusticeps Ekman, Ark. Bot. 13^{15}: 14. 1914.

The sheet of *Wright 284*, on which the species of Ekman was based, in the Gray Herbarium agrees with the species in every particular except the small number (twelve) of flowers in the head and the consequently more nearly cylindrical involucre.

Species-group Buxifoliae

In the mountains of Haiti and Santo Domingo occurs a group of three poorly known species of *Vernonia*. Only eight specimens have been examined in American herbaria by the writer, while Ekman mentions twelve in various European collections. One of these, the last to be described, is *V. Tuerckheimii* Urban, which seems to a well-marked and easily recognized species. Another is a form with small leaves, averaging only 7 × 12 mm., and a short, cylindrical or ellipsoid involucre 3–4 mm. in diameter, or spreading under pressure to 5 mm. For convenience this will be designated here as species A. The third, here referred to as species B, has leaves averaging 10 × 23 mm., and a turbinate or almost salviform involucre, spreading at its mouth to a width of 7–9 mm. even when not pressed. While the involucre of species A offers no noteworthy feature, that of species B is remarkable for its imbrication. It is composed of five vertical but gently spiral rows of scales, with ten to thirteen scales in each row, beautifully imbricated, and with the outer ones gradually reduced at the acuminate base of the head. Ekman had before him apparently only species A; at least he cites two collections which cover that species in the New York collection and fails to mention the peculiar involucre of species B, which is utterly unlike that of any other North American species. This species A is designated by him *V. buxifolia* (Cass.) Less., although he has not seen Cassini's type, and as a synonym he adds *V. domingensis* (Spreng.) DC., the type of which he has seen. These two names have been regarded as synonymous for over eighty years. The writer, in 1906, considered that species B was the true *V. buxifolia*, and described species A as new under the name *V. montana*. From this description and the cited specimen Ekman recognized that *V. montana* was co-specific with the plants which he had examined, and reduced *V. montana* to synonymy. At the same time he was unable to match Gleason's description of *V. buxifolia* (species B) with anything he had seen in European collections and decided that it was probably a new species. When he examined the New York material of these in 1914 he annotated the sheets of species A as genuine *V. buxifolia* and those of species B as "*V. buxifolia* forma."

Cassini described the involucre of *Lepidaploa buxifolia* as turbinate and regularly imbricated, with an assemblage of short rounded scales covering the summit of the peduncle at the base of the head. In this feature it can agree only with species B. De Candolle, in examining the type of Sprengel's *Proustia domingensis*, used terms which certainly apply to species B, but which do not emphasize the peculiar involucre. One can scarcely imagine that he would have passed by such a striking feature if the specimen had exhibited it. The writer is therefore convinced of the justice of maintaining *V. buxifolia* for species B, as he did in his revision in 1906. For species A, he must be guided by the negative evidence of De Candolle and the positive statement of Ekman in regard to *V. domingensis*, use that name for species A, and relegate his own *V. montana* to synonymy.

Vernonia morelana sp. nov.

A shrub 3–5 m. high, branching above; stems striate, closely gray-tomentose, becoming glabrate with age; leaf-blade firm, dull-green, ovate-oblong, 3 × 7.5 cm., on tomentose petioles 8mm.

long, entire or with a few low teeth, obtuse or rounded at the base and apex, closely scabrous-pubescent above, finely gray-tomentose beneath; upper and rameal leaves similar but smaller and more densely tomentose, those in the cymes broadly ovate to subrotund, 5–15 mm. long; cymes freely branching, forming a hemispheric cluster 2 dm. wide at the end of the branches; heads 21-flowered; involucre campanulate, 4–4.5 mm. high, its scales regularly imbricate, all appressed or barely spreading at the tip, outer and middle scales ovate to ovate-oblong, sharply acute or cuspidate, tomentose-ciliate and often puberulent on the back, inner scales lanceolate, sharply acute or subacuminate, 4 mm. long, nearly or quite glabrous; achenes thinly pubescent and densely resinous-glandular; pappus white or very pale tawny, the bristles 6 mm. long, the paleae narrow, 0.6–0.8 mm. long.

TYPE: *Pringle 7697*, collected by streams, Cuernavaca, Morelos, Mexico, altitude 5,000 feet, March 16, 1899, and deposited in the herbarium of the New York Botanical Garden.

While this species clearly resembles the other members of the species-group *Deppeanae* in leaf-habit, inflorescence, and pubescence, it is distinct in its glandular achene, a structure not observed elsewhere in the group. It resembles *V. canescens* H.B.K. in its white pappus, but differs in its pubescence and broader involucral scales. It approaches *V. Deppeana* Less. in its leaf-pubescence, but differs in its white pappus, sharper scales, larger involucre, and broader paleae. It is even more widely separated from the other species of the group.

Vernonia salamana sp. nov.

A shrub, 2–2.5 m. high, branching above; stem striate, thinly cinereous-pubescent or becoming glabrate; leaves thin but firm, pale olivaceous, the blades ovate-elliptic, 3 × 7 cm., undulate, entire or remotely denticulate with low teeth, obtuse or subacute, obtuse or rounded at base, distinctly pubescent or subtomentose above, finely pubescent beneath, especially on the prominent reticulated veins; petioles 4–8 mm. long, or the upper leaves nearly sessile; inflorescence of freely branched cymes, terminating the stem and the upper axillary branches and forming a large pyramidal panicle 2.5 dm. in diameter; rameal leaves similar to the cauline but smaller; cyme-branches leafless, straight, bearing three to six sessile, secund, 21-flowered heads; involucre broadly campanulate, 4–5 mm. high, its scales loosely but regularly imbricate, pale green with a darker spot near the tip, ciliate, puberulent on the back, obtuse to broadly rounded at the tip, the midvein becoming prominent near the apex and usually prolonged into a minute mucro; achene minutely pubescent on the ridges; pappus pale tawny, its bristles 4 mm. long, the paleae narrowly linear, about 0.4 mm. long.

TYPE: *Maxon & Hay 3385*, collected on dry plains near Salamá, Guatemala, January 22, 1905, and deposited in the herbarium of the New York Botanical Garden.

Vernonia salamana apparently finds its nearest relative in the well-known *V. patens* H.B.K., with which it agrees in its achenes, pappus, involucral scales, olivaceous leaves, and the finely pubescent lower leaf-surface. The shape of the leaf-blade is unlike that of *V. patens* and is closer to that of *V. Deppeana* Less. The pubescence on the upper side of the leaf and the prominent venation are distinctive.

VERNONIA MOLLIS H.B.K.

A plant collected by the Brothers Seler, number *3371*, has been identified by Hieronymus as *V. mollis* H.B.K. and distributed to American herbaria under that name. Ekman has considered the specimen as *V. canescens* H.B.K., to which it is obviously closely related, but from which it differs in the flat leaves and the tomentose lower leaf-surface, in its involucral scales, which are all subulate, and in its general habit. At the same time, it is doubtful if it is the true *V. mollis*. This is a Colombian species, described as having leaves sericeo-lanuginous beneath. This character is met with in certain Colombian specimens in the New York collections.

Vernonia ctenophora sp. nov.

Stem herbaceous, at least 4 dm. high, finely striate, thinly pubescent and resinous-dotted; leaves sessile or with petioles 2–4 mm. long; leaf-blades thin, ovate-lanceolate, entire, acuminate, obtuse or rounded at the base, as much as 5 cm. long by 2 cm. wide or the upper somewhat smaller, thinly puberulent and conspicuously glandular-dotted above, closely and finely gray-pubescent and resinous on the surface beneath and sparsely pubescent on the midrib and the obscure lateral veins; inflorescence of two or three elongated, erect, terminal or subterminal cymes; bracteal leaves resembling the cauline and progressively smaller, the upper only 15–20 mm. long; heads 20–35 mm. apart, sessile, 18–21-flowered; involucre campanulate, 6–7 mm. high, its scales irregularly but rather closely imbricate, the outer and middle with triangular-ovate or oblong appressed bases and long subulate tips, the inner linear-oblong, rather abruptly acuminate and most of them subulate-tipped, and all thinly pubescent with dark-colored hairs and sparsely resinous; achenes thinly pubescent, sharply ribbed, 1.5 mm. long; pappus white, its bristles 4 mm. long, prominently barbellate, the paleae little wider than the bristles, 0.6 mm. long, sharply ciliate with salient teeth.

TYPE: *E. A. Goldman 508*, collected at Apazota, Campeche, Mexico, December 30, 1900, and deposited in the United States National Herbarium as sheet 396871.

Vernonia ctenophora is a member of the species-group *Argyropappae*, as indicated by the resinous-dotted leaves and the long subulate involucral scales. Within the group it is most closely related to *V. hirsutivena* Gleason, from which it is distinguished by the conspicuously barbellate pappus bristles, the sharply ciliate and shorter paleae, the thinly pubescent involucre and achenes, the comparatively thin pubescence on the veins, and the numerous resin-dots on the upper surface of the leaf.

VERNONIA MISSURICA Raf.

Vernonia illinoensis Gleason, Bull. N. Y. Bot. Gard. 4: 211. 1906.

Throughout its wide range, which is more extensive and covers more diverse environmental conditions than that of any other species in the United States, *V. missurica* exhibits a considerable variation in structure. This variation pertains chiefly to the inflorescence and leaf-pubescence and less to the characters of involucre and achene.

Judged from herbarium evidence and field experience, the species is best developed in Indiana, Illinois, and northern Missouri, where it is by all odds the most common species of the genus. Here the inflorescence is broad, freely branched, with many heads, and relatively flat, and the leaves are thinly but closely tomentose beneath with cinereous multilocular hairs which cover the surface and veins alike. Farther to the northeast, at the border of its range in Michigan and Ontario, the multilocular hairs on the leaf-surface are relatively fewer and usually replaced by short straight conical hairs. The leaves are smaller and proportionately narrower, and frequently with a basal taper. Because of these structures, the species is frequently mistaken for *V. altissima* Nutt., from which it may be distinguished by the resin-dots on the leaf, involucral scales, and achenes. This extreme form has been described by Daniels under the name *V. michiganensis*, and the same thing from Ontario appears in several herbaria under another unpublished name.

Throughout this whole region, from Michigan to Missouri, the plants exhibit generally rounded to subacute, purple involucral scales, imbricate in relatively few series, and a purple pappus. This is the form described by the writer as *V. illinoensis*.

West of this region the species is much less common, and the herbarium material has been collected in widely scattered localities as far south as southern Texas. In general, the collections from west of the Mississippi and south of the Missouri Rivers have a loose open inflorescence, sharper and frequently smaller involucral scales, imbricate in relatively many series, and frequently green instead of purple, and a pappus which soon becomes tawny in color when exposed to light. But these differences are not constant nor even coincident on the same plant, so that even well-marked varieties can not be accurately distinguished. Yet in four cases out of five the geographical origin can be correctly guessed merely by a glance at the involucre of the plant.

Another area in which a form of the species occurs is the coastal region of southern Mississippi and Alabama. Whether similar plants also occur in southern Louisiana and southeastern Texas is not known definitely, but the inference is that they do. This extreme southeastern form differs in certain features from the species, so that it is recognizable at a glance, and it may be described as a variety.

Vernonia missurica austroriparia var. nov.

Inflorescence more or less elongate, very loose, open, irregular, and few-headed; leaf-blades broadest distinctly above the middle, thinly tomentose beneath or merely pubescent; resinous glands on the leaves, scales, and achenes as in the typical form of the species.

TYPE: *Tracy 8015*, collected at Tensaw, Alabama, August 18, 1904, and deposited in the herbarium of the New York Botanical Garden. Other specimens are: *Tracy 6970* from Ocean Springs, Mississippi; *Tracy 4780* from Coopolis, Mississippi; and various specimens collected by Mohr at or near Mobile, Alabama. In some specimens the leaf-pubescence is reduced in amount until the leaf resembles that of *V. altissima*. Such plants have been included under this variety because of the size of the heads, the character of the involucre and inflorescence, and the presence of resin.

Vernonia aborigina sp. nov.

Stem herbaceous, stout, striate or ribbed, covered with a brown tomentum becoming thicker above; leaf-blades ovate-lanceolate, remotely denticulate with low ascending callous teeth, acuminate, narrowed below into an obtuse or rounded sessile or subsessile base, 8–15 cm. long, scabrous above with short papillose hairs, densely brown-tomentose beneath; inflorescence rather small and compact, 11–13 cm. wide and bearing relatively few (about 30) heads; bracteal leaves on the cyme-branches lance-oblong, 10–15 mm. long; heads large, in fruit about 12 mm. high, containing in the single head counted 68 flowers; involucre broadly rounded at the base, 7–8 mm. high, expanding to 16–18 mm. wide at maturity; involucral scales closely and regularly imbricated, the outer minute and triangular and all squarrose or recurved at the tip, acute, sparingly ciliate along the brown margin, resinous-glandular and thinly puberulent along the purple central two thirds, elsewhere green and glabrous, tipped with a rather prominent carinate midvein which is frequently prolonged into a short mucro; achenes 3.5 mm. long, olive in color, with low ridges and broad flat furrows, conspicuously glandular in the furrows, minutely and sparsely puberulent on the ridges; pappus-bristles reddish-tawny, almost plumose below, merely barbellate above, 7 mm. long, paleae as long as the diameter of the achene, narrowly linear, equaling in width or barely wider than the bristles.

The type was collected by P. H. Rolfs in Oklahoma, west of Fort Smith, Arkansas, August, 1891, and is deposited in the herbarium of Iowa Agricultural College as sheet number 32272. No other material has been examined.

The description of this new species is offered with considerable reluctance, because of the great variabilty of the western species and their known tendency to hybridize. In several features it differs from all other western species. The large heads, the unusual number of flowers in each head, the olive-colored, glandular achenes, and the reddish, conspicuously barbellate pappus distinguish it from all others. The squarrose scales separate it from all others except *V. Baldwini* Torr., the very narrow paleae from all except *V. interior* Small and the species-group *Fasciculatae.* It is to be hoped that further collecting in a somewhat neglected region may bring to light additional material.

Vernonia fasciculata nebraskensis var. nov.

Leaves shorter than in the typical form of the species, narrowly lanceolate, denticulate, acute, pale-green or yellowish green; heads closely crowded.

TYPE: *Rydberg 5400*, collected in Kearney County, Nebraska, July 14, 1900, and deposited in the herbarium of the New York Botanical Garden. Numerous other sheets occur in all larger herbaria; in fact, almost all of the Nebraska specimens labeled *V. fasciculata* are to be referred to this variety. The species proper occurs only along the Missouri River, so far as known to the writer, while the variety extends westward more than half the length of the state. Although the brief varietal description apparently offers but little evidence for the separation of a variety, nevertheless the Nebraska specimens in any large herbaria all look alike, all look different from the rest of the species, and can be separated at a glance even by a person not familiar with the genus, as the writer has been able to demonstrate.

VERNONIA ALTISSIMA PUBESCENS (Morris) Daniels

Inner involucral scales tipped with a short, straight, flat, erect, linear tip, not over 2 mm. long.

While Morris's variety was originally separated primarily by the character of the foliage, this is, as has been pointed out by Blake, due to some unusual pathological or teratological condition. The shape of the scales, on the other hand, is found as described above not only in Morris's type but in several other herbarium sheets from the Alleghenian region, from Pennsylvania and Ohio south to Alabama and South Carolina, and in isolated collections of Wilkinson from Mansfield, Ohio.

Vernonia altissima brevipappa var. nov.

Lower surface of the leaf-blades with a few multilocular hairs along the veins; paleae only 0.1–0.3 mm. long; otherwise as in the typical form of the species.

TYPE: collected by J. Schneck at Mt. Carmel, Illinois, August 13, 1891, and deposited in the herbarium of the University of Illinois.

Vernonia altissima laxa var. nov.

Heads smaller than in the species, 13–21-flowered; inflorescence broad, irregular, very loose and open; inner involucral scales often apiculate, the middle scales frequently sharply acute; resin-dots none; leaf and pubescence as in the typical form of the species.

TYPE: *Harper 1936*, collected at Newton, Georgia, August 19, 1903, and deposited in the herbarium of the New York Botanical Garden; duplicates of the type are in the Gray Herbarium and the herbarium of the Field Columbian Museum. Other specimens of this southern or coastal plain variety are *Tracy 8046* and *Eggleston 5142*.

Vernonia flaccidifolia angustifolia var. nov.

Leaves narrowly lanceolate, denticulate, only 1–2 cm. wide; otherwise as in the typical form of the species.

TYPE: *ex herb. Torrey*, collected in Alabama and deposited in the herbarium of Columbia University; another sheet in the New York collections is from Georgia, ex herb. Chapman.

Vernonia ovalifolia purpurea var. nov.

Leaves with numerous multilocular hairs on the veins of the lower surface, the upper leaves subtending the branches truncate on rounded at the sessile base; pappus purple; otherwise as in the typical form of the species.

TYPE: *F. S. & E. S. Earle 99*, collected at Auburn, Alabama, July 22, 1899, and deposited in the herbarium of the New York Botanical Garden.

Vernonia jucunda sp. nov.

Stem apparently herbaceous, at least 4 dm. high, erect, sparingly branched, densely villous when young, becoming floccose when older and glabrate at about 3 dm. from the summit, faintly striate and reddish brown under the pubescence; leaf-blades ovate-oblong, as much as 38 × 80 mm., narrowed toward the sessile base or into a short margined petiole, undulate and irregular at the entire margin or rarely with a few low salient teeth, frequently a little revolute, acute at the apex or short-acuminate into a small subulate tip, dark-green and rugose above with impressed veins and scabrous with papillose hairs or hair-bases, gray or nearly white beneath with a close fine tomentum; lateral veins prominent, ascending and straight almost to the leaf-margin; upper and bracteal leaves similar but smaller; heads five-flowered, in a sympodial raceme, standing opposite and a little (2–3 mm.) below a bracteal leaf which later bears secondary heads in its axil, primary heads eight to ten; involucre 8 mm. high, 2.5 mm. wide, with its stiff scales imbricate and appressed at the base and squarrose at the tip, lanceolate-oblong to ovate-oblong, broadest below or near the middle and long-acuminate into a subulate, glabrous, terete, callous tip, the outermost green, one-half the length of the purple inner ones, and all papillose-villous with erect hairs on the exposed portion; corolla apparently pale purple, its tube glabrous, not ampliate above, 5 mm. long, its lobes glabrous, 3 mm. long by 0.6 mm. wide, with parallel sides and triangular tip; filaments glabrous, attached at two thirds the height of the tube; anthers 2.8 mm. long, minutely rounded at the triangular tip, their obtuse bases 0.5 mm. long; style hairy along the upper 1.4 mm., its branches 1.4 mm. long, tapering, hairy on the outer side; achene 2.5 mm. long, shallowly ten-ribbed, pubescent with short erect hairs on the ridges; pappus-bristles pale tawny, 6.5 mm. long, barbellate; paleae linear-lanceolate, 1.0–1.1 mm. long by 0.09–0.18 mm. wide, trough-shaped and pubescent on the inner face.

TYPE: *Purpus 7060*, collected in the Sierra de Tonala of Chiapas, Mexico, October, 1913, and deposited in the herbarium of the University of California as number 173434. Other sheets of the same collection are in other American herbaria and agree in every particular with the type.

Vernonia jucunda is the first species of the section *Stenocephalum* to be discovered in North America. Other members of the section are South American; one species, probably undescribed, occurs in Colombia and a number in Brazil. The section is characterized by few-flowered heads set a short distance below the bracteal leaf, by an involucre constricted at the throat and composed of subulate, more or less squarrose scales, and by leaves which are usually revolute and tomentose beneath.

Among the many interesting plants collected by Charles Wright in Cuba, his number 2789, described by Grisebach as *Vernonia lepidota*, is one of the least known. Wright described it as a suffruticose plant, ascending on bushes to a height of about 3 meters, with purple flowers. The Gray Herbarium contains a large specimen which shows the foliar characters very well, but is too immature for a careful study of the floral structures, achenes, or pappus. Ekman examined three sheets of the same number in European herbaria, including Grisebach's type, and has published the first good description of its reproductive structures. A few of his observations have been verified at the Gray Herbarium. Ekman points out that its anthers and styles agree with those of the genus *Vernonia*, but that its pappus is entirely different. The inner pappus is composed of not more than seven flattened bristles, and the outer of scales which are coalescent into a cylindrical tube with lacerose margin. This feature alone is sufficient to warrant the erection of a genus for it, which may appropriately be named in Ekman's honor.

EKMANIA gen. nov.

Inflorescence a corymbiform cluster, freely branched and beset with petiolate bract-like leaves; heads homogamous, few-flowered; involucre of a few series of closely appressed scales; corolla glandular without; style and anthers as in *Vernonia*; achene glabrous, ten-ribbed; pappus biseriate, the outer of a cylindrical tube with lacerose margin, the inner of five to seven stout flattened bristles; stem and foliage lepidote.

Type species: *Vernonia lepidota* Griseb.

Ekmania lepidota (Griseb.) comb. nov.

Vernonia lepidota Griseb. Cat. Pl. Cub. 145. 1866.

Leaf-blades elliptic-oblong, the larger ones 3.5 × 8 cm., the upper smaller, thinly silvery-lepidote above, densely fulvous-lepidote beneath, entire, obtuse or subacute, prominently veined; the larger bracteal leaves petiolate, 10–13 mm. long and one-nerved, the others more crowded distally and gradually reduced in size to short subterete scales 2 mm. long, closely appressed to the involucre and distinguished from it chiefly by their lepidote pubescence; involucre 3 mm. high, its brown scales trough-shaped or boat-shaped, acute, pubescent or scurfy on the back.

Oliganthes Milleri (Johnston) comb. nov.

Vernonia Milleri Johnston, Proc. Am. Acad. **11**: 698. 1905.

The structure of the pappus of this little-known species from the island of Margarita indicates clearly its affinity with *Oliganthes* rather than with *Vernonia.*

Piptocoma rufescens latifolia var. nov.

Leaf-blade narrowly ovate or elliptic, two to three times as long as wide, broadly obtuse or rounded at the apex, abruptly narrowed at the base, its tomentum loose and thin; petiole 1 cm. long; involucre larger and its scales more tomentose than in the typical form of the species.

TYPE: *Britton, Britton & Shafer 104,* from a coastal thicket on Water Island, St. Thomas, January 31 to February 4, 1913, and deposited in the herbarium of the New York Botanical Garden; a second sheet in the same collection is *Britton & Shafer 845,* from a coastal thicket on Salt Island, Tortola.

The species of *Elephantopus* occurring in the southeastern United States have long been a difficult problem for taxonomists. *E. carolinianus* Willd. and *E. nudatus* Gray are quite distinct and have generally been recognized. Gray, in the Synoptical Flora, in 1886, combined *E. tomentosus* L. with *E. elatus* Bertol., and in general Bertolini's species was not recognized until 1901. Baker then regarded it as distinct and gave some valuable comparative measurements. While the difference in length of involucral scales and pappus is distinct in mature heads, it is not always reliable at earlier stages. Possibly for this reason, Baker's measurements have been neglected by recent authors, and Small has separated the two species chiefly on characters of leaf and pubescence, which are unfortunately exceedingly variable.

One diagnostic character has however been overlooked. In *E. tomentosus* the hairs on the midvein are generally reflexed, while on the leaf-surface proper many or all of the hairs point backward. In *E. elatus* the hairs of the midvein are longer and stiffer and point distinctly forward. Separated by this character, many specimens usually referred to *E. tomentosus* are found to belong to the other species, having also the short, heavily invested scales and short pappus ascribed by Baker to *E. elatus*, and only the leaf-shape of *E. tomentosus*. These may be described as a variety.

Elephantopus elatus intermedius var. nov.

Leaf-blade elliptic or oblong, abruptly narrowed to the base, less than three times as long as wide; stem comparatively short and sparingly branched; pappus sometimes as much as 5 mm. long.

TYPE: *Tracy 4741*, collected at Coopolis, Mississippi, September 8, 1898, and deposited in the herbarium of the New York Botanical Garden. The variety is represented in herbaria by numerous specimens, and is distributed from southern Mississippi east along the coastal plain to Georgia and south to Lee and Dade Counties in southern Florida.

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